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EXAMINER	
THAKUR, VIREN A	

ART UNIT	PAPER NUMBER
1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,448	WAKAMURA, MASATO	
	Examiner	Art Unit	
	VIREN THAKUR	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 19 November 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 15-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 15-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. As a result of the cancellation of claims 1-14, the rejection of claims 114 under 35 U.S.C. 112, second paragraph has been withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 15-18 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn (US 5658530) in view of Wakamura et al. (JP 2000-327315), Sakurada et al. (US 6004667) and in further view of Shimamune et al. (US 4882196).

Dunn teaches methods for deactivating biological contaminants and chemical contaminants on the surface of a perishable food product or on the packaging material

by passing light through the package (Column 2, Lines 49-61; Column 3, Lines 34-41). Thus, Dunn teaches applying the anti-microbial composition to the food itself or to the packaging containing the food. The surface of the packaging material or food product is supplemented with titanium dioxide, which when illuminated at specific light frequencies will deactivate contaminants within the package or on the surface of the food product (Column 3, Lines 14-23; Column 4, Lines 59-62). Dunn further teaches the inner surface of the container comprising the titanium dioxide (Column 11, Line 58 to Column 12, Line 30). Dunn teaches applying a photocatalytic material to food containers or directly to foods.

Regarding instant claim 15, Dunn is silent in teaching preparing Ti-modified calcium hydroxyapatite and bringing food into contact with the Ti-modified calcium hydroxyapatite.

Wakamura et al. teach that titanium oxide has been well known to be an antimicrobial agent (Paragraph 0002). Wakamura et al. further teach that titanium oxide does not have the properties for adsorbing matter, such as microorganisms on its face and limited oxidative degradation of such microorganisms is achieved using titanium oxide, alone (Paragraph 0002). Wakamura et al. teach that titanium oxide films have limited oxidative degradation function when used on its own and calcium phosphate compounds such as hydroxyapatite tends to lose its adsorption power when adsorption equilibrium is reached (Paragraph 0006). The invention of Wakamura et al. teach a combination of the photocatalyst activity of titanium with the adsorption activity of hydroxyapatite that maintains the adsorption power of the calcium phosphate while maintaining the oxidative disassembling properties of the photocatalyst (Paragraph 0002; Paragraph 0006; Paragraph 0007). Wakamura et al. further teach that calcium hydroxyapatite has been well known to adsorb organic substances (Paragraph 0003). To the ordinarily skilled artisan, it would have been obvious that as result of the adsorption properties hydroxyapatite would have enabled the removal of microbes from the surface of a material. By coprecipitation of the metallic oxide with the hydroxyapatite, Wakamura et al. teach replacing part of Ca with Ti (Paragraph 0010 and Example). Wakamura et al. further teach wherein the metal modified hydroxyapatite

can be applied to several "configurations" such as a sheet, a film, a plate, a particle and a tablet (Paragraph 0017). Wakamura et al. teach that the sheet or film can be used to cover one or both sides of a base material (Paragraph 0017).

Sakurada et al. is relied on to teach that it has been well known to combine hydroxyapatite with a metal such as titanium for the purpose of providing an antimicrobial food packaging film (Column 5, Lines 18-22; Column 6, Lines 10-14 and 55-63; Column 9, Lines 19-26; Column 10, Lines 49-65).

In summary, Wakamura et al. teach that the modified hydroxyapatite can be shaped into several configurations and can be applied as a coating to a base material. Wakamura et al. teach that the titanium oxide provides oxidative degradation properties as well as antimicrobial and germicidal properties. Dunn similarly teaches using titanium oxide for its photocatalytic antimicrobial properties for foodstuffs and food containers. Sakurada et al. similarly teach that the coating combination of titanium oxide and hydroxyapatite can also be used in food packaging containers and wrappers; thus teaching multiple uses for the combination and further teaching that hydroxyapatite has been well known to remove microbes from food products. Given these teachings, it would have been obvious to one having ordinary skill in the art to coat a food container of Dunn using a metal-modified apatite, as taught by Wakamura et al. for the purpose of providing the oxidation disassembly properties of a photocatalyst such as titanium with the adsorptive properties of the calcium hydroxyapatite. Wakamura et al. teach that titanium oxide films have limited oxidative degradation function when used on its own and calcium phosphate tends to lose its adsorption power when adsorption equilibrium is reached (Paragraph 0006). This suggests to the ordinarily skilled artisan that the ability of the titanium of Dunn to fully prevent microbial growth would not have been efficient. Therefore the modification of using hydroxyapatite modified with titanium would have resulted in improved oxidation disassembly and absorption power of the hydroxyapatite and as a result, the anti-microbial properties of the container of Dunn would have been further improved.

Claim 15 further differs from Dunn, Wakamura et al. and Sakurada et al. in reciting wherein the Ti-modified hydroxyapatite is sintered at 580 to 660°C.

Shimamune et al. teach the use of sintering at between 300°C to 900°C for the purpose of providing a layer on the substrate which has sufficiently high strength and for providing a titanium composite material having high affinity for the substrate (Column 4, line 65 to Column 5, line 15 and Column 10, lines 31-34). The actual temperature depends on the thickness and state of the calcium phosphate compound (Column 4, Lines 41-53). Shimamune et al. further teach a coating comprising hydroxyapatite (i.e. calcium hydroxyapatite) (Column 3, lines 5-9) and a metal, such as titanium (Column 2, Lines 37-40; Column 3, Lines 38-59). In forming the coating Shimamune et al. teach a calcium phosphate compound solution that further comprises hydrochloric or nitric acid and can further contain a metal such as titanium salts. The titanium alloy is also partly dissolved when in solution (Column 3, Line 60 to Column 4, Line 5). As a result, when the solution is calcinated, the titanium forms a chemical bond with the calcium phosphate compound to form a firmly adherent calcium phosphate coating (Column 4, lines 1-4). Since the titanium bonds with the hydroxyapatite when in solution, there would have been a reasonable expectation of the titanium modifying the calcium phosphate compound. The calcium hydrogen phosphate used in the covering layer can be the same as that of the base layer (Column 4, Lines 34-37); therefore, the covering layer can also have the calcium hydrogen phosphate with bonded. To strengthen substrate and the adhesion of the coating, Shimamune et al. teach sintering the covering layer, (which can be the same as the base layer) and the base layer (Column 4, Lines 62-64), at a temperature from between 300 to 900°C.

Wakamura et al. teach heating at about 500°C (Paragraph 0013) and Shimamune et al. teach that the temperature used to sinter and thus laminate the modified hydroxyapatite coating onto the substrate is varied depending on the thickness of the coating to be applied. Therefore, depending on the desired thickness of the coating applied by Dunn et al. modified by Wakamura et al., it would have been obvious to one having ordinary skill in the art to adjust the sintering temperature for the purpose of ensuring the strength of lamination. Furthermore, in applying such a film to the food package of Dunn, it would have been obvious to ensure that the anti-microbial film has high strength and affinity to the substrate to which it was applied. Additionally, applying

a thicker coating of the film of Wakamura et al. to the substrate of Dunn would have required higher sintering temperatures and thus, to sinter between 580 to 660°C would not have provided a patentable feature over the prior art.

Regarding instant claim 16, Dunn et al. teach placing food into a container coated with an anti-microbial coating. Dunn et al. modified by Wakamura et al. teach using titanium modified hydroxyapatite as the coating and Shimamune et al. teach sintering in order to provide strength in lamination of titanium modified hydroxyapatite. Therefore modified Dunn et al. teach putting food in a container having an inner surface coated with sintered titanium modified calcium hydroxyapatite. Regarding instant claim 17, modified Dunn et al. teach coating food packaging with sintered titanium modified hydroxyapatite, and Wakamura et al. also teach wherein the substrate can be a sheet or film. Therefore to wrap food would have been obvious to the ordinarily skilled artisan, in light of the fact that the prior art teaches packaging food in containers coated with titanium modified hydroxyapatite and since the prior art also teaches applying the coating to films. Regarding instant claim 18, as discussed above, Dunn et al. teach applying an antimicrobial agent to the food, and Dunn et al. modified by Wakamura et al. and Shimamune et al. teach adding sintered titanium modified hydroxyapatite to food.

Regarding instant claims 20-25, the art already teaches food packaging and further teaches films and other food packaging materials to which titanium modified hydroxyapatite can be applied. Therefore, since the prior art teaches placing food into food packaging that is coated with titanium modified hydroxyapatite, that the food preserving articles, such as food containers and food wrapping would not have provided a patentable feature over the prior art.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-18 and 20-25, above, and in further view of Okamoto (JP 2000-051041).

Okamoto teaches tableware, such as a drinking cup that comprises a photocatalyst for the purpose of removing odor and dirt from the inner portions of the tableware. Thus, Okamoto teaches providing similar photocatalytic activity to the surfaces of tableware for the purpose of preventing dirt and odors that collect on the inner surface from affecting the taste of the food.

Given these teachings, it would have been obvious to one having ordinary skill in the art to apply the coating of modified Dunn to other items such as tableware. Since the coating of modified Dunn can be applied as a wrapper or as a coating on a container and can further be applied to medical tools, cans, and bandages, to name a few (See Sakurada et al. Column 10, Lines 49-65), one would have had a reasonable expectation of success in applying the coating to cups and forks as spoons, for example. Such a modification, as taught by Okomoto, would have prevented dirt and odor from imparting an undesirable taste to the food product.

6. Claims 15-18 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn (US 5658530) in view of Mawatari et al. (US 5614568) and Bontinck et al. (US 4367312) and in further view of Shimamune et al. (US 4882196).

Dunn is taken as applied in the rejection above in paragraph 4. Regarding instant claim 15, Dunn teaches bringing food into contact with an antimicrobial agent, such as titanium dioxide, but is silent in teaching bringing the food into contact with hydroxyapatite modified by titanium.

Mawatari et al. teach antibacterial resin compositions which are applied to the surface of molded articles and can be used in many fields (Column 1, Lines 34-37). Mawatari et al. further teach that the styrene resin to which the antibacterial resin composition is applied has been used in kitchenware applications (Column 1, Line 17). To the ordinarily skilled artisan, kitchenware includes containers that hold food items. Mawatari et al. further disclose wherein an anti-bacterial metal such as iron or silver (Column 5, Lines 3-6) is bonded to a porous substrate such as hydroxyapatite (Column

7, Lines 22-49). Mawatari et al. further teach wherein by supporting the metal ions on the porous substance, the porous structured substance have been subjected to ion-exchange with the metal ions (Column 4, Line 62 to Column 5, Line 2). Thus, the metal ion would have replaced the ionic calcium in the hydroxyapatite, as recited in instant claims 2, 8 and 11. As a result, the metal supported on the substrate would not be dissolved out by water treatment (Column 7, Lines 43-47) and thus can be applied to the molded article such as the polymeric resin at any amount (Column 7, Lines 47-49). By being able to apply the combination of the hydroxyapatite with the metal ions in any amount, Mawatari et al. solves the problem of providing satisfactory antibacterial activity to styrene resins that was not available in previous methods.

Bontinck et al. teach styrene resins (See Abstract) for protecting foodstuffs, pharmaceuticals, cosmetics, toys, tools and similar articles, such as surgical instruments (Column 1, Lines 13-17). Bontinck et al. further teach packages of food products such as biscuits using the packaging film (Column 13, Lines 34-43).

In summary, Dunn teaches containers for food products and desires deactivation of contaminants that grow on the surface of the food product or the food product container. To the ordinarily skilled artisan, it would have been well known that styrene resins have been commonly used in food packaging applications. Bontinck et al. is cited as further evidence of styrene resin films used for food wrapping applications. Mawatari et al. teach improving the antibacterial activity for styrene resin molded articles using a metal ion and hydroxyapatite. An ion-exchange occurs between the hydroxyapatite and the metal ion to secure the ion to the surface, thus allowing any amount of the antibacterial material to be applied to the surface of the molded article. Given these teachings it would have been obvious to one having ordinary skill in the art to bond the titanium of Dunn to the hydroxyapatite, as taught by Mawatari et al., for the purpose of increasing the antibacterial activity to styrene resin containers, which have been well known to be used for packaging food products. As a result of bonding the metal ions to the hydroxyapatite, as taught by Mawatari et al., it would have been obvious to one having ordinary skill in the art that the titanium of Dunn would have replaced the calcium of the hydroxyapatite in an ion-exchange. Such a modification

would have increased the amount of the antibacterial metal applied to the containers of Dunn, thus further improving the antibacterial ability of the food package. Additionally, as taught by Mawatari et al., water-treatment tends to dissolve out the metal ions from the hydroxyapatite and food product have been well known to undergo water treatment such as for steam sterilization which can affect the amount of the metal ions on the surface of the food product. By bonding the metal to hydroxyapatite, dissolution of the metal would have been prevented and thus the ability of the food products to be protected against antimicrobials would have been improved.

Claim 15 further differs from Dunn, Mawatari et al. and Bontinck et al. in reciting wherein the titanium modified hydroxyapatite is sintered at 580 to 660°C.

The reference to Shimamune et al. is taken as applied above in paragraph 4. Shimamune et al. are relied on as a broad teaching that sintering hydroxyapatite would have resulted in increased strength of the surface layer of the substrate as well as increased strength of the substrate itself (Column 10, lines 31-34). Therefore it would have been obvious to one having ordinary skill in the art to sinter the titanium modified hydroxyapatite of modified Dunn for the purpose of increasing the strength of the surface layer and the strength of the substrate.

Regarding instant claims 16 modified Dunn teaches containers having an inner surface coated with sintered titanium modified hydroxyapatite, into which food is placed.

Regarding instant claim 17, Bontinck et al. teach protecting foodstuffs that are wrapped in a styrene resin. Mawatari et al. teach providing antibacterial properties to styrene resins. Similar to Dunn, Bontinck et al. also teach protecting food using but instead of using a container Bontinck et al. packaging films. Nevertheless, since these films are also made of styrene resins it would have been obvious to one having ordinary skill in the art to apply the titanium bonded with the hydroxyapatite, as taught by modified Dunn for the purpose of preventing contamination of the foodstuffs and the pharmaceuticals that have been wrapped in the film. Such a modification would have ensured that the pharmaceutical and food products remain fresh and free of bacteria.

Regarding instant claim 18, Dunn already teach applying the antimicrobial component to the food or the food packaging. Therefore, it would have been obvious to

use the antimicrobial coating of modified Dunn (i.e. the titanium modified hydroxyapatite) in a similar fashion for the purpose of improved antimicrobial protection beyond that provided by titanium dioxide only.

Regarding instant claims 20-25, the art already teaches food packaging and further teaches films and other food packaging materials to which titanium modified hydroxyapatite can be applied. Therefore, since the prior art teaches placing food into food packaging that is coated with titanium modified hydroxyapatite, that the food preserving articles, such as food containers and food wrapping would not have provided a patentable feature over the prior art.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-18 and 20-25 above, in paragraph 6, and in further view of Okamoto (JP 2000-051041).

The reference to Okamoto and the reasons for rejection are applied as cited above in paragraph 5.

8. Claims 15-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurada (JP 11-343210) in view of Wakamura et al. (JP 2000-327315) and Dunn (US 5658530) and in further view of Shimamune et al. (US 4882196).

Sakurada teaches applying a photocatalytic metal such as TiO_2 (Paragraph 0008) and an adsorption ingredient such as hydroxyapatite (Paragraph 0014) to paper, cloth and plastic products that can be used for food packaging (See Abstract). As a result bacteria and viruses are adsorbed into the coating and sterilization is carried out by the photocatalytic action of the metal (See Abstract). As a further result of the invention of Sakurada the need to carefully clean and wash articles that need to be sterile can be aided by adding the coating of Sakurada: this would have prolonged the sterility of the article without increasing the burden to wash and clean the article. (See Paragraphs 0003-0004).

Regarding instant claim 15, Sakurada is silent in teaching wherein the hydroxyapatite adsorbent is modified by titanium.

Wakamura et al. are taken as applied above in paragraph 4.

Dunn is relied on to teach antibacterial packaging using photocatalytic titanium for food packages and to the surface of food products, as cited above in paragraph 5. Dunn further teaches that such packaged foods have been known to be placed in refrigerators for storage (Column 1, Lines 22-28). Dunn further teaches the inner surface of the container comprising the antibacterial titanium photocatalyst (Column 11, Line 58 to Column 12, Line 30).

Given the teachings of Wakamura et al. it would have been obvious to bond the titanium with the hydroxyapatite of Sakurada, since Wakamura et al. teach that on their own the antibacterial ability of the photocatalytic titanium is limited and the adsorptive ability of the hydroxyapatite diminishes when the adsorption equilibrium is reached. Such a modification would have provided the extended antimicrobial action that was desired by Sakurada so as to lower the burden on the consumer to clean and wash such articles.

Claim 15 further differs from Sakurada et al. modified by Wakamura et al. and Dunn in reciting wherein the titanium modified hydroxyapatite is sintered at 580°C to 660°C.

The reference to Shimamune et al. is taken as applied above in paragraph 4. Shimamune et al. are relied on as a broad teaching that sintering hydroxyapatite would have resulted in increased strength of the surface layer of the substrate as well as increased strength of the substrate itself (Column 10, lines 31-34). Therefore it would have been obvious to one having ordinary skill in the art to sinter the titanium modified hydroxyapatite of modified Dunn for the purpose of increasing the strength of the surface layer and the strength of the substrate.

Regarding instant claims 16 and 17, the plastic products of Sakurada are used as food packaging and are further coated with the hydroxyapatite and metal photocatalyst. Therefore, Sakurada teaches adding metal-modified apatite to the material with which the food container is made. Dunn teaches applying the

photocatalyst to the inner surface of the container for the purpose of providing antibacterial activity to the surfaces confining the food product. As a result, any microbial growth inside the container would have been killed, thus spreading the growth of the microorganisms to the food product. Therefore, it would have been obvious to one having ordinary skill in the art to coat the inner surface of the container with the metal modified apatite for the purpose of preventing the spreading of microbial growth from the inner surface of the container to the food product. Additionally, bacterial and microorganisms have been well known to one having ordinary skill in the art to grow within the confines of food containers.

Regarding instant claim 18, Dunn teaches deactivation of the contaminants as the surface of the food product (Column 6, Lines 35-65). Dunn teaches that as a result improved organism deactivation within one millimeter of the surface of the food product can be achieved (Column 6, Lines 24-34). Additionally, it would have been obvious to one having ordinary skill in the art that food products such as meats have been well known to grow bacteria on the food surface prior to packaging. This provides motivation to the ordinarily skilled artisan that a need exists to provide the same prolonged antibacterial activity at the surface of the food product. Given these teachings, it would have been obvious to one having ordinary skill in the art to apply the coating of Sakurada to the surface of the food product for the purpose of providing prolonged antibacterial activity to meat products that have a tendency to grow microorganisms at the surface.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 15-18 and 20-25 above, in paragraph 8, and in further view of Okamoto (JP 2000-051041).

The reference to Okamoto and the reasons for rejection are applied as cited above in paragraph 5.

Response to Arguments

10. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Dunn et al. teach using an antimicrobial coating on containers for food products and on the food products themselves. Wakamura et al. teach that titanium modified hydroxyapatite coated to substrates such as films, for example, provides improved antimicrobial properties over titanium oxide, and thus provides the motivation for coating food containers with titanium modified hydroxyapatite.

11. Applicants' argument on page 5 that Wakamura et al. discloses heating the Ti-CaHAP to 100°C has been considered but is not deemed persuasive. This heating is the aging process (Paragraph 0019) which is similar to the aging process of applicant's which also ages for the similar temperature and time, as disclosed on page 14, line 10 of applicant's specification. This is different from the sintering process.

12. Okamoto et al. is not relied on to teach Ti-CaHAP but rather is relied on to teach the conventionality of coating tableware with an antimicrobial coating.

13. Applicant's argument on page 6 that Sakurada '667 does not teach or suggest that Ti-CaHAP has an antibacterial effect which would make it suitable for usage in food preservation has been considered but is not deemed persuasive. On column 10, lines

49-60, Sakurada '667 teach antimicrobial films applied as coatings on food wrappers and food containers.

14. Applicant's argument on page 6 regarding Shimamune et al., that there is no teaching or suggestion that Ti-CaHAP is formed at the boundary between the Ti-substrate and the base layer has been considered but is not deemed persuasive. It is noted that Shimamune et al. teach on column 4 that titanium and the hydroxyapatite are in an ionic solution and are precipitated together when heated (Column 4, lines 1-20). This is a coating that would be applied to the base layer wherein the titanium forms a chemical bond with the hydroxyapatite (Column 4, lines 1-5). Shimamune et al. are precipitating the hydroxyapatite bonded with titanium. Although the actual process might be different, Wakamura et al. similarly teach the concept of co-precipitation in an acid solution comprising hydroxyapatite and titanium. Therefore, there would have been a reasonable expectation that since titanium is bonded to the hydroxyapatite would result in titanium modified calcium hydroxyapatite.

Applicant further asserts that Shimamune et al. heats at 300 to 900°C for the purpose of calcinating the calcium phosphate compound and not to sinter Ti-CaHAP. It is noted that calcinating is performed at between 200 to 800°C for the purpose of forming the coating (Column 4, lines 6-12), and Shimamune et al. further teach sintering for the purpose of lamination of the coating (Column 4, lines 44 to column 5, line 17).

In any case, it is further noted by the examiner that Shimamune et al. is relied on for the concept of sintering for the purpose of improving the strength of the hydroxyapatite coated substrate (See Column 10, lines 31-34) and as such, Wakamura et al. already teach titanium modified hydroxyapatite.

15. Regarding the different rejections under 35 U.S.C. 103(a) it is asserted by the examiner that each rejection is pertinent as they provide different motivation for using titanium modified hydroxyapatite and thus provide several reasons as to why the instant claims would have been obvious over the prior art.

16. It is noted that the term hydroxyapatite is, by definition, known as calcium hydroxyapatite.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIREN THAKUR whose telephone number is (571)272-6694. The examiner can normally be reached on Monday through Friday from 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/V. T./
Examiner, Art Unit 1794

Steve Weinstein
STEVE WEINSTEIN
PRIMARY EXAMINER 1794
2/4/08